

London Society for the Extension of University Teaching.

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ANNUAL

# ADDRESS TO STUDENTS

BY

SIR JAMES PAGET, BART., F.R.S.

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OPENING ADDRESS BY DR. WESTCOTT.

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REPORT OF THE COUNCIL AND STATISTICS FOR 1887.

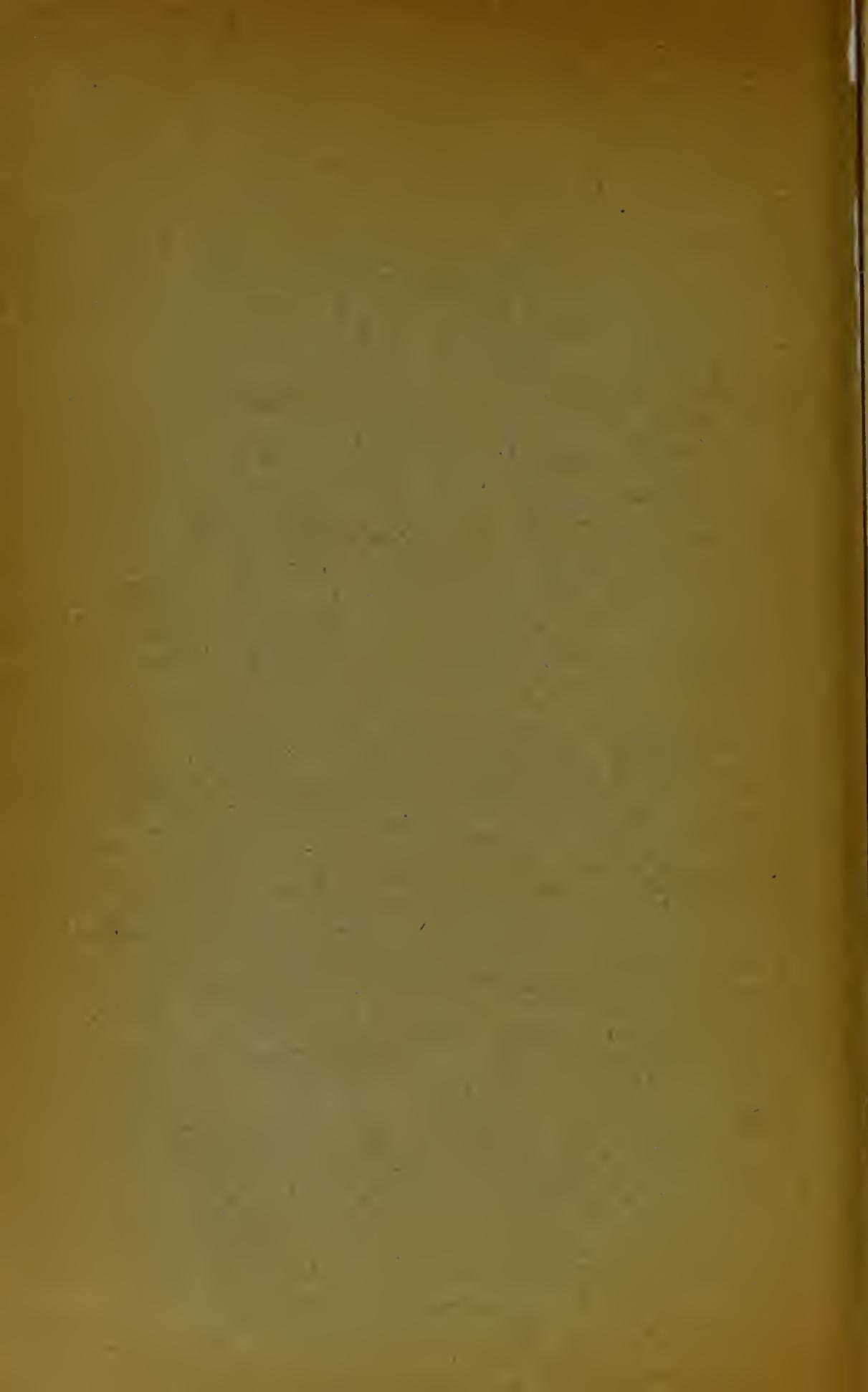
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AND 19, RUSSELL STREET, COVENT GARDEN.



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1888.



# SCIENTIFIC STUDY.

BY

SIR JAMES PAGET, BART., F.R.S.,

BEING THE ANNUAL ADDRESS TO STUDENTS, DELIVERED AT THE  
EGYPTIAN HALL, MANSION HOUSE, ON MARCH 3RD, 1888,  
AT 3-30 P.M.

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THE Right Hon. The LORD MAYOR presided, and the Hall was crowded in every part with students from the various centres.

Sir JAMES PAGET said: The subject of Scientific Study in its full range would be far beyond my power and your patience. I shall believe, therefore, that I may speak of only some parts of the study, and of these only as they may be pursued within the range and in the manner designed by this Society, and as they may be followed by the majority of those who attend the lectures and the classes. Moreover, I can have no choice but to select my illustrations from the parts of scientific study with which I have myself been occupied. In comparison with the whole field, these parts are very small, but they may serve well for supplying examples of what I chiefly wish to speak of, namely, the utility of scientific study for the education of some portions of the mind; its utility, not only for the teaching of truth, but for the teaching of the methods by which truth has been attained.

I should like, first, to meet an objection which I have often heard made to the teaching that is given by the Society, and which is summed up in what is regarded as a very wise proverb—that “a little knowledge is a dangerous thing.” As with most of the merely popular proverbs, the very opposite, if stated unconditionally, would be quite as true and quite as false; but in the present instance the objection may be met by observing that, in the Society’s teaching, they who will may learn far more than can fairly be called a little knowledge. As I looked through the syllabus of such subjects as I can estimate, I could see that the amount of teaching in each of them is enough for a good beginning for some who may intend to make that subject a chief study for their lives, and enough to form an important part in the teaching of anyone who wishes to be, in the fairest sense, generally well educated.

But, really, as for the proverb, anyone observing facts may often see that, in all practical life, a little knowledge is far less dangerous than is complete ignorance. Whether either of them be dangerous depends on a man’s temper and general character, not on his intellect; it depends on whether he is habitually rash or prudent, humble or conceited; and seeing that, as a rule, none have so few doubts as they that are quite ignorant, and as their ignorance includes a total want of self-knowledge, so there are none more dangerously rash than the very ignorant are apt to be.

Now, scientific study may be so pursued as to help to the acquirement of self-knowledge as well as of the knowledge of other facts. Its utility is, at least, two-fold: direct, in the facts and general principles which

may be learned; and indirect, in the cultivation and refreshment of the mind.

As for the use of knowing the chief facts of science, or of any branch of it, this may seem to be proved in every hour that we live. For the practical applications of science extend into every occupation of life; into the provision of every kind of food; into the management of the air we breathe, and of the light and heat in which we are to work; they are so influential in every form of business, in every art and manufacture, that it might seem impossible to live in safety without some scientific knowledge. It may, indeed, be said, and often with much truth, that all these applications of science are best left to those who have studied them as the chief business of their lives, and who must know best about them. This is often true; but even experts can best guide those who know something of their language, and they may best be controlled and assisted and most safely trusted by those who know the real value of scientific study and of the truths to which it can attain; by those who, while studying the facts of science, have studied also, as I have said, the methods by which the facts have been acquired and made sure.

Now I will speak of four chief portions of this education of the mind; but let me say that they are only a part of all that may be gained. They are educations (1) in the power of observing; (2) in accuracy; (3) in the difficulty of ascertaining truth; (4) in proceeding from the knowledge of what is proved to the thinking of what is probable; and for all these ends I shall try to illustrate the value and the need of very careful study by showing their difficulties. The glories and the triumphs of science are often celebrated; some of its failures and difficulties may better illustrate the necessity for earnest study by those who would be successful in it.

By education in the power of observing, I mean not only the power of seeing things, but that of seeing and observing them in their various relations to things around them. Many suppose that this is easy; really it is very difficult, and few overcome the difficulty except those who are either naturally endowed with an unusual power of observing accurately, or have been carefully trained and are constantly training themselves.

The difficulty of observing is proved by nearly every discovery; for in nearly every instance the discovery is made by the accurate observation of facts which have been within the reach of many, but have been overlooked by all except the discoverers.

In my own profession, with its hundreds of careful observers, not a year passes, scarcely a month or a week, in which there is not made known some form of disease, or some symptom of disease, previously unobserved; and when it is thus made known it is at once evident to many who had overlooked it; they may have seen it, they did not observe it. And the same might be said, I think, of nearly every scientific pursuit, in natural history, in chemistry, and physics. Look at the proceedings of any scientific society; see the new facts of which they tell. Could not many of them have been observed long ago? Obvious as the facts are now, why were they not sooner ascertained? Because observation is really very difficult even to those who are keen and watchful and ambitious of discovery, and many whom have been well-trained.

This is equally evident in the study of the works of those who have been most successful, and whom we justly count amongst the greatest observers. Look at the works of Darwin: and here let me say that every scientific study should include the reading, not only of the best manuals, but of some of the works of at least one great master; for even if the

facts he tells have become part of popular knowledge, yet the method of his work may be a lesson for all ages. I say, read Darwin's works or his life; see the constant repeated looking for facts that they might be observed again and again; the looking for them in all changing circumstances; the tests applied; the doubts that would have made a less patient man nearly hopeless; and from all these things reckon how great must be the difficulty of accurate observation, how great the need of careful cultivation of all the power of observing which we may possess. And you may note that a large part of Darwin's observations were made on things that nearly everyone could have seen. Any one of his contemporaries might have studied the work of earth-worms, say in Hyde Park, when again and again we could see the heaps of mould thrown up by them and themselves crawling about in the mornings after showers. We saw them, but no more observed them, no more thought of them, than we did of the drifting clouds or of the dust-carts.

I mention this facility of opportunities for observation, because many are prone to think that for scientific study you must have laboratories and costly apparatus and hours every day to spare; and that these things are impossible to the vast majority of the students in this society's classes. The city of London is a very good place in which, by one of many examples, to disprove this. You know Sir John Lubbock and his charming scientific works on Ants and Bees, and in a wide range of natural history. It would be hard to find a better naturalist in this range of study; but it would be just as hard to find a better man of business, or one more earnest in political life, or in the kindly social purposes in which he uses all its opportunities, and it would be hard to find one more ready to promote by his own efforts all that is good in social and scientific work. Remember his example when you have to listen to the nonsense talked about the study of science being incompatible with a life in business.

And this reminds me to say that an intimate association of science with business may be very useful if it makes it more clear to some men of science that, by carrying on their researches till they attain an immediate practical utility, they may vastly increase the means for acquiring more knowledge. It is strange how often, and with what heavy loss, at least for a time, scientific men, as if for want of enterprise, have stopped short of this. Some years ago I studied and wrote on the history of the discovery of anaesthetics.\* It is too long to tell now, but it shows that before the discovery was made, it was, as we may say, within reach of Sir Humphry Davy, Faraday, and others among the best men of science of their time. It was really made by such as may be called practical men, using scientific facts. I can briefly tell another instance of such stopping short which may seem yet more remarkable. It was told to me by my brother, Sir George Paget, who, more than fifty years ago, attended the lectures on Chemistry at Cambridge by Professor Cumming. The Professor, when describing to his class the discovery by Ørsted of the power of an electric current to deflect a magnet, used to say—"Here, then, are the elements which would excellently serve for a system of telegraphy;" and yet neither he nor any of the active and cultivated men who heard him moved onward to the discovery and invention by which not only the use but the knowledge of electric science has been so increased.†

All these things may show the difficulty of observation and the need of earnestness and watchfulness in observing. Of course, it cannot be

\* "Nineteenth Century," Dec., 1879.

† In the "Home Life of Sir David Brewster," 1839, is an account of a method of electric telegraphy used in 1753 by Mr. Morison, of Greenock, and published in the "Scots Magazine" of that year.

learned without practice, and you may ask, where can we practice scientific observation here in London? I might answer, anywhere—even in natural history, you may study the habits of the London wild birds; there are many besides the sparrows; or you may study the wild plants on any piece of ground left undisturbed for two or three years. Long ago, when I studied botany, there was such a piece of ground, scarcely bigger than this hall, near my father's house in Yarmouth, and there I found more than fifty species. The origin of such plants, whether from seeds in the ground or from those in the air, how far one can exclude another, the influence of London atmosphere, their attraction of insects, and many other things would be worth observing. At least, in these and the like things, you may learn to observe, and then you will love to observe, and then some good will come of it.

Let me speak now of that second advantage of scientific study: its teaching of accuracy—accuracy not only in observing, but in recording, remembering, and arranging facts.

I hardly need say that accuracy is essential both to the maintenance and to the progress of knowledge. All would hold this; but different persons have very different standards of what they would call accuracy, and many have a very low standard of it. Here then, again, I would urge you to study and imitate the work of some true master in science. The works in exact science or in mathematics would, I suppose, be best; but of these I cannot speak, and I hope it is with no foolish pride in what has been best in my own studies if I believe that, in all the sciences of observation, there is nothing more accurate than is the description of the human body in the chief books on human anatomy. There is not a part visible to the naked eye, and within reach of the most minute dissection, which is not so exactly described that the description can bear the tests of close examination again and again repeated every year, in every anatomical school. And even beyond this, the minutest parts of every structure have been examined with the highest powers of the microscope, and accurately described and drawn. Take this as the standard of accuracy to which you should try to attain.

And I think I can be nearly sure that a great part of this accuracy is due to the habit which many anatomists have of writing descriptions of what they observe while the objects are before them. I have had so much experience of this in the making of museum-catalogues that I cannot doubt its utility. Looking and writing, looking and writing, looking and correcting again and again; thus at length may come an accurate description. And, surely, this is only after the custom of every good painter of scenery or portraits. He may make clever sketches of what he remembers to have seen, but for a complete likeness he looks, may be, twenty times at everything, and paints exactly what he sees. So should all who would be accurate in scientific records; science should not be less accurate than art can be.

I think this scientific cultivation of accuracy cannot be too strongly urged. It may be one of the happiest means of teaching accuracy in speaking and in thinking and in designing new lines in which to continue one's course of study. And it may be very useful in ordinary life. Look at its opposite in the boundless mischiefs of inaccuracy, and these not always from dishonest people, but from the careless, the inconsiderate, the prejudiced. Do we not all know people, good people too, who would not for their lives tell a lie, but seem as if they could not for their lives tell the truth?

All this may fairly lead to my speaking of the utility of learning in

scientific study the difficulty of ascertaining truth. This difficulty is shown in all the facts I have been speaking of; yet in many of the ordinary affairs of life it is assumed to be trivial, or, more remarkably, there are very wide differences of custom due to different estimates of this difficulty. Any newspaper will illustrate these differences. See, first, what is done to ascertain truth in courts of law, say for a case of theft or in an action for slander. Everyone who is to state the facts is examined on his oath; then he may be cross-examined, to detect wilful errors, lapses of memory, or any other inaccuracy. Facts on both sides must be thus heard. Then there follow pleadings for both sides, and each side may say the best it can for itself, the worst it can for the other; then comes a careful recital of the evidence and an impartial summing-up by the judge; and then the deliberation of twelve men deemed fit to decide what is true, and who have sworn on oath that they will do so if they can. Thus they decide; and yet there may be an appeal, and the whole question may be raised again.

Now no reasonable person would desire less care than this for finding what is true when justice is to be done, especially when, on one side or the other, there may be attempts to conceal the truth or to tell untruths. But surely the contrast is too great between this just care and the carelessness with which, under other conditions, statements are accepted as true. I might draw the contrast from any mere private reports of slander or from any other part of a newspaper; say the report of a contested election, in which one may read how the opposite views as to matters of fact as well as of opinion are maintained by vehemently opponent pleadings, and then without any cool dispassionate summing up, without much deliberation, each side is positive that it has the truth, and that even on matters of fact it is right and the other is utterly wrong. But I need not multiply instances; let any one only think of the grounds on which he is ready to accept as true any ordinary statement and compare these with what would be required if that statement were to be tested in a court of law.

Of course, we cannot apply these legal tests to all the things that come before us, but at least we should educate ourselves towards the wish for similar accuracy; towards the habit of judging of probabilities according to the care given to find the truth. And this is just what scientific study may do for us, by showing us how truth is only reached by repeated observations, by experiments and tests, by records and revisions, by discussions in societies, in journals, in reviews, by all the means that may detect fallacies and bring out the mere truth.

It is thus that science may justify itself in claiming credit for encouraging the love of truth; and I think it may fairly do so; for the desire for truth in one department of the mind will usually tend to increase the desire for it in other parts, and the love of scientific truth does, I believe, sustain and increase the love of moral truth.

But the having spoken of the attainment of truth in courts of law suggests to me to remind you that the oath makes a witness promise to tell the truth, the whole truth, and nothing but the truth, and in large ranges of science, though the truth and nothing but the truth may be attained, yet the whole truth very seldom can be. This is especially the ease with the sciences that have to do with living things; for in these everything is in relation with so many and variable conditions that it is very hard to arrive at an unconditional conclusion. Few things are absolute. A distinguished French surgeon used to say that there were two words that a surgeon should never use, namely, "jamais," and "toujours." The same principle is maintained, I think, by Mr. Gilbert

in H.M.S. Pinafore, "Never? what never? well, hardly ever." Certainly it is illustrated in biology.

Nothing might seem more constant than the likeness of offspring to their parents; but the likeness is with difference, and we know not why. The rule of likeness between the two lateral halves of many animals and leaves of plants is very general; but the likeness is very rarely exact, and we know not why. In the organic world nature is not mathematically exact—not uniformly constant—at least in so far as we can yet see; and we do not know the reasons of the deviations.

Now, it is well to bear all this in mind, and to feel that when we talk of exceptions and chances and the like, though we are very apt to persuade ourselves that we are talking of just and final conclusions, yet really we may be only shifting away from the confession of the imperfection of our knowledge; we may be wrongly persuading ourselves that we have not only the truth, but the whole truth. Scientific study will teach you that exceptions to admitted laws are really examples of other laws not yet accurately ascertained; and that the events which we refer to chance, as if it were a determining force, are only some of those of which we have not traced the precedents. Exceptions, chances, and such like words, relate entirely to things of which we have as yet very imperfect knowledge or none at all; our hope must be that the number of such things will be diminished by scientific study.

And now let me say something of that last method of education of the mind by scientific study, which may teach it how to proceed from the knowledge of what is proved to the thinking of what is probable. I shall not discuss the values, or rules, of safe induction or deduction from facts; it should be done in the language of logic, but that is a language which I cannot speak; and I suspect you may learn the rules better in the lives or works of some of the great masters in science. Say, again, if you like, of Darwin, or, if you have time, in such a book as Whewell's History of the Inductive Sciences. If you read Darwin, observe the immense quantity of facts he gathered before he enunciated his induction as to the law of natural selection; the doubts he felt and then slowly dispersed; the suspicions of error which preceded his conviction of the truth. And then study his caution as to what might be deduced from it; his anxiety for facts which might test his belief or his guesses; how different from the confidence with which some people seem to think it easy to explain everything.

I am sure I cannot too strongly urge you thus to study the difficulties of scientific thinking before you venture to practice it. I love to quote a saying of the greatest of all scientific workers in my profession—John Hunter. He used to say to his pupils, "Dont think: try." He meant, "don't think that you can safely decide that, because you know some things to be true, therefore some others must be true; 'try' whether they are, test them, watch them; do not be ready to say positively 'from this it follows,' or anything of that kind; 'try' whether it does." And the whole history of science proves his wisdom; for, though it is a glorious history of progress in knowledge, yet every page is disfigured by the examples of hindrances of that progress by errors; and the vast majority of these are errors, not of observation, but of thinking. Men have said that knowledge is power, and they have tried too soon to grasp it; and they have grasped at the shadows of it, at the shadows cast by themselves, while by their erroneous thinking they have obstructed the light of truth.

Now, you may ask, what is to be the reward of all this study? Would not some other knowledge, in the pursuit of which there is less risk

of error, less need of all these cantions, serve as well? I do not believe there is; I do not believe there is one more useful or more happy-making than is scientific stdy. I have read the admirable address on the study of literature given here last year by Mr. John Morley, but it has not converted me. I must hold still to the preference for the teaching of science and to its utility for every part and manner of life. Surely there is no one in any calling who may not be the better for having studied and practised careful observation and accuracy, and the habit of ascertaining trnht and of thinking cautiously; and in science all these and many other of the best mental qualities may be enltivated even while we are gaining tho power and happiness of knowledge. And scientific knowledge *is* power. Think of the telegraph and telephone! look, when yon leave this hall, at those wires overhead, and think of those underground; think of the incessant talking and writing that is going on along those wires—the carrying of questions and answers on all the interests of life over hundreds of miles in a few seconds—the bringing near of the minds of thonsands who are far apart—the inestimable aids to happiness and utility. It was the power of scientific knowledge that did this.

Think of the abolition of pain by anaesthetics, or of all the utilities of photography in its profoundest scientific researches, in historic records, in the domestic happiness that even the poorest may have while they can see around them the memorial portraits of those that are far off. It was the power of scientific knowledge that did this.

Nay, look anywhere; see if you can find a place in all this land where there is not evidence that scientific knowledge is power for the welfare of men. And thongh we may not become of the number of those by whom great discoveries are made, yet it is no trivial thing to be members of the same class with them, to know their language, to be able to admire their power and skill and victorious work, even as it is a just pride to be among the people of a mighty nation, though we may add nothing to its power.

And scientific knowledge *is* happiness. Everyone who possesses any fair share of it and uses it well will tell you so, and for those who are engaged in various daily occupations it may be the truest and best mental reereation; for recreation is not mere idleness, not mere absolute rest after work; the best is a willing active occupation in something quite unlike the ordinary business of one's life. And I think it may be said of scientific study that it is remarkably fit for satisfying some of the natural desires of the mind which are least likely to be satisfied in the regular business of life, or are only satisfied by being misused. There is the natural love of novelty, the desire for the satisfaaction of enriosity. It is hard to satisfy them in ordinary routine; very easy to do so in gossip and credulity; much better, surely, to do so in the unbounded stores and progress of science.

And there is the love of wonders; it is hard to satisfy it with anything, however marvellous and admirable, with which every day's work makes one familiar. We mnst all, I think, have seen this when we have been looking at some marvellons machinery, some machine working with such precision, sneli calenlated acenracy, snch definite purpose, that we might imagine the mind of its inventor to be dwelling in it. We have stood still in wonder; and yet the workman feels none; to him every movement is foreseen, the purpose is well known, there is no happiness of novelty, no strange sight, no thought of wonder.

To the scientific student there are new wonders everywhere. Let mo tell the last that I observed. Mademoiselle Janotta was so good as to play on the piano, at my request, one of the swiftest pieces of music

known to her, a presto by Mendelssohn. The time it occupied was taken, and the number of notes was counted. She played 5,995 notes in four minutes and three seconds; rather more than twenty-four notes per second. We may from this estimate, approximately, the number of what we may call nervous vibrations transmitted during a given time to and from the brain; from the brain to the muscles; and from the muscles and the organs of hearing and of touch to the brain. Each note required at least two voluntary movements of a finger, the bending down, and the raising up; and besides these there were a very large number of lateral movements to and fro of the fingers as well as many and various movements of the wrists, elbows, shoulders, and feet. It was not possible to count these, but I think I can be sure that they were not less than at the rate of one movement for each note, making, altogether, not less than three voluntary movements for each note, even if we allow for the chords in which several notes were struck at the same instant. Certainly there were not less than seventy-two distinctive variations in the currents of nerve force transmitted from the brain to muscles in each second, and each of these variations was determined by a distinct effort of the will. And observe, for herein may seem a chief wonder, each of these movements was directed by the will to a certain place, with a certain force and a certain speed, at a certain time; and each touch was maintained for a certain length of time. Thus, there were, as we may say, five distinct and designed qualities in each of the seventy-two movements in each second.

Moreover, each of these movements, determined by the will and exactly effected by transmission of nerve-force from the brain along nerve-fibres to the muscles—each of these movements was associated with consciousness of the very position of each finger, each hand, each arm, and each foot, before it was moved and while moving it, and with consciousness of the sound of each note and of the force of each touch. Thus, there were at least four conscious sensations for each of the twenty-four notes in each second; that is, there were at the rate of ninety-six transmissions of force from the ends of nerve-fibres, along their course to the brain, in each of the same seconds, during which there were seventy-two transmissions going out from the brain along other nerve-fibres to the muscles. And then, add to all this, that during the time, in each second of which the mind was conscious of at least ninety-six sensations, and directed not less than seventy-two movements, it was also remembering each note to be played in its due time and place, and was exercised, with the judgment, in the comparison of the playing of this evening with those of times before, and with some of the sentiments which the music was intended to express. It was played from memory, but Mademoiselle Janotta assures me that she could have played it as swiftly at sight, though this would have added another to the four sensations associated with each note.

Surely, it is impossible to imagine what goes on in a brain thus occupied; I think it is most impossible, if that may be said, to one who has seen a brain and has carefully examined it. Really, it is inconceivable; and here I will end, for here is a lesson for the most serious thoughts. In facts such as these science achieves the knowledge of the reality of things more wonderful than the imagination can conceive; it sustains the faith which holds that many things that are inconceivable are yet surely true.

PROCEEDINGS OF THE CONFERENCE OF MEMBERS OF  
THE COUNCIL, THE UNIVERSITIES JOINT BOARD,  
AND LOCAL REPRESENTATIVES.

HELD AT THE

*CHARTERHOUSE, FEBRUARY 28th, 1888.*



# CONFERENCE

HELD IN THE

TAPESTRIED ROOM AT THE CHARTERHOUSE,

FEB. 28TH, 1888.

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THIS was the largest and most representative Conference hitherto held, and was attended by over a hundred representatives of centres. The chair was taken by the Marquis of RIPON, who was supported by the following members of the Universities' Joint Board and the Council:—The Rev. Dr. Westcott, Cambridge; the Rev. the Rector of Exeter College, Oxford; Mr. E. B. Poulton, Jesus College, Oxford; Professor Foxwell, St. John's College, Cambridge; the Rev. Canon Elwyn; the Rev. Prebendary Whittington; the Rev. S. A. Barnett; Sir Owen Roberts; Mr. H. L. W. Lawson, M.P.; Mr. Mocatta; Mr. Keatley Moore; Mr. Sinkler; Miss Smith; Miss Gurney.

The Marquis of Ripon, with a few words of introduction, called upon Dr. Westcott to lay the following subject before the Conference:—“The desirability of securing a regular sequence in study and systematisation in the work, in order that Students at local centres may be enabled to obtain a definite mental training, such as the following out of a course of study for degrees is designed by the Universities to provide for their own Undergraduate Members.”

Dr. WESTCOTT said: The subject which is proposed for our consideration this evening follows by a natural sequence from that which was discussed with happy results last year. The perfecting of the local organisation which was discussed then, has, as we learn from the Report, placed the educational work of the Society on a sound financial basis. It is proposed, therefore, that some effort should now be made to give completeness to the education itself. This question, indeed, promises to become a practical one at no distant date. A resolution of the Council was to-day laid before the Joint Board, inviting them “To suggest courses of study, including lectures and reading, extending over a period of years, such as would enable students following such courses to feel assured(1) as to the general mental training they had acquired—(2) as to the special training in any one subject,” and the Board have undertaken the responsibility of endeavouring to frame a scheme which shall serve these ends. But it is evident the success of any scheme which they may be able to propose will depend upon the hearty and efficient co-operation of Committees and students; and they are, therefore, anxious to be assured from the first of the sympathy of their fellow-workers with the main principles which they desire to embody.

You will observe that the subject, as it is offered to us in the agenda paper, defines an object and suggests a method of obtaining it. The object is "a definite mental training," and the method is "a regular sequence in study, and systematisation in the work." Allow me, then, to say a few words on each of these points.

1. I shall assume that the University Extension Lectures have a direct intellectual aim. These lectures supply, I trust, an agreeable recreation, but they are essentially something different. They are designed to have a serious educational use. Under this aspect we may regard them either as a preparation for special work, or as a general intellectual discipline. I know how great is the temptation to adopt the former view; to measure the value of learning and knowledge by a material standard. But special training is not the work of a University, and, if I may speak my whole mind, I confess that I am alarmed and ashamed when I hear the results of science treated as instruments for successful competition; when I find the language, the methods, the aims of war transferred to the conditions of commerce and the circumstances of daily life. No University will lend itself to the pursuit of such an end. Universities exist to maintain and propagate a nobler faith. So far as we have entered into their spirit, we believe, and we strive to spread the belief, that life is as the man is; that if the man is sordid, selfish, narrow, mean, his life, however affluent, will reflect his character; and, on the other hand, that there is about us an inexhaustible store of unrealised possibilities, a treasure of spiritual wealth, open to the poorest, which grows with the using if only we know how to use it. And we believe that true education opens the eyes of the soul; that it is a strength in the difficulties which we must face; a solace in the sorrows which we much bear; an inspiration in interpreting the new truths which claim to receive from us a harmonious place beside the old: that it offers to all a vision of a larger order truly human and truly divine; that it is not, in the noble words of your motto, "a means of livelihood, but a means of life."

2. Such an education, then, and nothing less than this, is the education which a University seeks to convey. To convey such an education is the object which our society proposes to itself, not to place in the hands of the bread-winner a keen weapon, but to call into generous activity the fulness of his power. What kind of knowledge then, we ask, is fitted to make a man educated in this sense? It must, we can see at once, bring training, the true sense of work; and it must bring inspiration, the passion for work. It must be broad; and it must be thorough. The student must have an intelligent view of the wide field of knowledge, and he must have a full view of the little field which he seeks to make his own.

(a) The student must, I say, seek to gain a wide view of the whole field of knowledge. I do not mean that he must laboriously accumulate innumerable details. A living encyclopaedia would fail to satisfy the conditions which we require him to recognise. For he must strive to obtain a vital sense of the relations of science one to another, of their unity and their differences, of the immeasurable depths which lie beyond our utmost reach, of the limits which confine our present knowledge, of the limits which confine our powers of knowing. Now we shall admit, I think, that such a wide—not superficial—view is especially needed now. We all know the temptations of isolated study; we know the complexity, the richness, the fascination of each little fragment of nature or life to which we may devote ourselves; we know how it is enough to occupy us, to absorb us, and, if we do not guard ourselves against the danger, to deaden us to all besides. We are not in the position of the great Masters of the

Renaissance—a Leonardo or a Michael Angelo—when the highest could embrace all. But we can in a humble way catch something of their spirit. We can learn to feel the vastness of the whole domain of man. Each realm of study has its own methods, its own lessons; each type of truth has its own verification. And we can in some measure come to understand them.

Let me attempt to illustrate my meaning. We look within: we become conscious of the conditions which determine our conceptions of things in time and space. From these flow inevitably the deductions of pure science. We look without; and we become aware of the phenomena of nature and life which lie open to our observation. We are impelled to arrange, to classify, to express them in their most general terms. But while we trust the “laws” so gained, which are true if our observation is perfect and exhaustive, we know that here there is nothing final. At any moment a new phenomenon may offer itself. We recognise that we are standing in the presence of endless possibilities, of truths unrealised. So we go a little further. We not only look within and without, but we look also beyond, above, beneath, however we may call it, and we feel that there is a meaning in this great sum of things, in these multitudinous parts; that there is something in us not subject to time and space; that there is an element of infinity in the simplest object. Stirred by this manifold experience, we seek to give expression to that which we have known, it may be in words, and all literature is ready for our guidance; or it may be through material elements, and all art opens her treasures.

Thought, observation, imagination, expression; the true student must take account of the functions of all these; of what they can do and of what they cannot do. He must, to reduce our demand to its lowest terms, grow familiar at least with subjects which represent the characteristic teaching of both literature and physical science. The discipline, the widening of thought, which comes through these complementary studies, is priceless. And when I look back to my own school days there is nothing which moves me with deeper gratitude to my illustrious master (the first Bishop of Manchester) than the memory of the watchful care with which he constrained his pupils to give thought to other subjects than that perfect scholarship which it was his own work to interpret. I learnt lessons from lectures of Haydon, which he enabled me to attend, that have helped me in dealing with mysteries of faith. I mention this to claim for others what at least I know to be fertile in intellectual fruits.

(b) The student who has gained this sympathetic insight into different realms of knowledge will be prepared to enter upon the effective study of his own chosen subject. He will know its position, its relation, its limits; he will strive to make it his own. He will cherish the invigorating hope of doing a little to complete the inquiries on which he enters. He will necessarily desire that the teaching which he receives shall be thorough—thorough in character and thorough in extent. Those who have attended the University Extension Lectures during the last year will know that adequate provision is made to satisfy the first requirement. There is the syllabus by which the student may prepare himself for the lecture. There is the class which follows the lecture, where difficulties can be solved by personal intercourse with the lecturer. There is the weekly paper work, which gives precision to floating thoughts. There is the final examination, which reveals the true learner to himself even more surely than to the examiner. Ample provision is made for thoroughness in the narrow range of a single course of lectures, but there is yet need for greater continuity of instruction. Exactly in proportion as we are

interested in the higher objects of the Society, we plead urgently that what is done for one or two terms may be arranged for two or three years. The separate courses of lectures need not to be altered in their character in the least degree. They require only to be so grouped that a student may be enabled to carry on from stage to stage his systematic training. This, then, is the particular plan which we desire to commend to you. We know that we make a large demand, and that we offer a lofty ideal. But I believe that large demands and lofty ideals alone stir enthusiasm; and the demand has already been justified. The Cambridge Affiliation scheme, which requires from privileged students such a system of instruction as I have indicated, both varied and continuous, has found a welcome at Newcastle, Sunderland, Hull, Scarborough, and Derby. And, as we have been reminded lately, the question of University teaching for London is now urgent. A teaching University for London, if it is to fulfil its proper work, must include as one of its elements a system of instruction such as the extension lectures are able to offer. In these we have a method which embodies, under changed conditions, the University spirit. The organisation which they represent is economical. It reaches classes who have not hitherto had the advantages which it offers. It provides for the due recognition of successive stages of attainment. It opens what may be a proper avenue to a degree. It is, I venture to think, not unlikely to call out private munificence. Here, at least, it is difficult not to think that Sir T. Gresham will find some successor among the great merchants of to-day. Let the extension work be once recognised in its breadth and in its thoroughness, and I am unwilling to believe that the capitalists of our chief city will leave it without means. We all indulge in dreams, and when I have thought over the future University of London, a new type in new surroundings, I have fancied that new colleges, new hospitals, will be founded for its students, in which young men may learn to live hardly and think nobly, like the students of old times, and sustain one another in their brief hours of leisure and study by the confession of generous aims.

But even if such a dream is vain, I cannot be wrong in supposing that this work of University Extension has a far deeper meaning, a far larger power, than we recognise at once. Such a form of education as it supplies, sustained and elevating, offers a substitute for excitements which need to be exaggerated if they are still to please. It seems to bring hope in regard to our anxieties and perils, in thought and work. For what is the character which will be shaped under its influence? The student who has felt its power will be thorough and sincere; he will know what is required before a learner can speak with authority, and he will shrink from improvising dogmas and affecting a certainty which he has not reached. Such a student will be truthful and candid; he will recognise the limits of his own province; he will confess his needs; he will not claim a monopoly of truth for his own method. Such a student will be sympathetic; he will gladly turn for help to others, and will rejoice in the progress of those who work in fields far removed from his own. Such a student, above all, will be patient; he who knows even a little of the majestic course of truth will be content to wait when disappointments close over his own labours. The sense of weakness at every point, the sense of imperfection, is but "a triumph's evidence for the fulness of the days." Such, in brief, is the object, such is the method, which we commend to you this evening. If the work which has been roughly sketched calls for labour and effort, continuous and earnest, the prospect which it opens of a larger, fuller, purer, life is worth striving towards. The education which we ask you to spread, the more confidently as you know its

conditions and its power, can do more to meet the needs of our own time than bring some material return. It is an energy to enoble every condition and every circumstance of the simplest human life.

Dr. R. D. ROBERTS said : It may be convenient if I state briefly what has already been done in this direction by Cambridge. The University of Cambridge, under a special statute, formulated last year an affiliation scheme, under which any centre, where due provision is made for carrying on a regular course of work for a period of years, may become affiliated to the University. A student desiring the privileges of affiliation must go through a course of study which includes eight courses of twelve lectures and classes each. He must do regular weekly work for the lecturer, and pass the examination, conducted by an outside examiner appointed by the University, at the end of each course. He must, in addition, pass an examination in elementary mathematics and languages. The privileges of affiliation which a student satisfying all these conditions may enjoy are : (1) That he is excused the previous examination ("the little go"); and (2) he may enter for a tripos examination at the end of two years' instead of three years' residence ; (3) that he is entitled to be styled " Student affiliated to the University of Cambridge." This scheme has already been adopted by five towns, as Dr. Westcott intimated. Mr. Moulton, who is giving the first affiliation course at these centres, has sent me the following interesting report on the work. Dr. Roberts then read the report, in which Mr. Moulton stated that the Affiliation scheme had brought a large accession of students from new sources. There was especially an increase in the number of young men, a class whom it had been hardest to attract hitherto; and a large proportion of the new comers were persons connected with primary education. One of the difficulties in carrying the scheme, he said, was the impression prevailing in some quarters that the Extension System was educationally loose and a makeshift, and that it would prove a back door through which lazy people would get a University degree. The fact is that the test we impose of requiring steady work, to the satisfaction of the lecturer, all through the term, instead of trusting merely to an examination at the end, tends to raise the standard of our education without the danger of pressure at particular periods. This is illustrated by the fact that out of 242 students who were registered as intending to take the Affiliation course at Newcastle, only 121 reached the standard in weekly work, and were thus entitled to enter for the final examination. Mr. Moulton, in his report, then went on to speak of the effect of the Affiliation scheme on the steadiness and continuity of work. He pointed out that already a great impulse had been given to the Students' Associations, which meet weekly to discuss difficulties before sending in their exercises to the lecturer. The effect of such meetings upon the character of the answers sent in has been most remarkable, and if the promise of this first year is maintained he believes that Students' Associations will be found to have solved some of our greatest difficulties, besides affording machinery by which private reading and study can be kept alive during the interval between one session and another. Finally, Mr. Moulton says : " It is perhaps presumptuous for one who will not be present at the Conference to offer any remarks on the proper policy to pursue. But as I have been engaged in the practical work of the University Extension movement, both teaching and organising, now for fourteen years without intermission, I may, perhaps, be permitted to put briefly some of the impressions made on me by my experience.

" 1. I believe that the general method of teaching, known as the ' University Extension System,' and turning upon the prominence given

to a teacher, assisted by weekly exercises and final examinations, as distinguished from the employment of mere examination tests, is applicable to the whole course of liberal education, and that, as compared with the system followed in the Universities themselves, it gives *ceteris paribus*, higher educational results.

"2. The effect of a 'title' or 'degree' is, in practical educational work, very great in the way of giving unity and connection to study, as well as in attracting students. To the half-hearted it gives an incentive to work; to the earnest students it gives system, counteracting the tendency so common in such persons to an undisciplined variety of subjects.

"3. I believe that proper academical recognition for the work done by students is equally important in connection with financial organisation. In endeavouring to found and develop University Extension centres, we have felt the immense difficulty of attracting substantial pecuniary support to anything so loose as a 'movement.' I cannot but think that if the London organisation were an incorporation with powers to affiliate students or grant degrees, it would find that its academic position would be readily grasped, and the proper pecuniary support readily forthcoming."

Mr. H. E. MALDEN drew attention to the difficulties which lecturers meet with in losing sight of their students at the end of a course of ten lectures. He felt that a scheme such as the Cambridge Affiliation scheme would make too great a demand upon the time of those attending the lectures at London centres, and suggested that a scheme of two years' instead of three years' study should be drawn up.

Mr. V. B. LEWES dwelt upon the great need which was felt among students taking his subject (Chemistry) for more advanced and especially practical work. It was the six months' interval between the end of the Lent term and the beginning of the Michaelmas term which was the great weakness of the Extension Scheme, and the establishment of spring or summer courses would go a long way to strengthen the work of the Society. He pointed out the advantage which students would obtain if there were a central institution at which classes for advanced students could be held, and where facilities would be offered for practical work.

The Rev. W. WALTER EDWARDS felt that the number of courses required for the certificate of continuous study was far too many to make it of much practical value to the students. Local secretaries had always an initial difficulty to meet, which was the financial difficulty. There was very little local enthusiasm, and audiences could not be secured unless they were consulted as to the subject of the lectures. If any plan of affiliation were adopted necessitating a definite scheme of study extending over a number of terms, he thought the different centres in London might be grouped, so as to provide the necessary courses for students, who could move from one centre to another in order to follow out their course of study. He thought the course of study required under the Cambridge Affiliation scheme too long for London students, but if a two years' course was arranged, students should be able to attend the requisite courses at different centres where they might chance to be delivered within the whole of the district of London.

Mr. LANT CARPENTER spoke of the Chautauqua Movement which has reached such very large proportions in America, and of a similar scheme which has been started in England. He also referred to the excellent work of the Recreative Schools Association, which he thought would prepare the way for the work of the Society.

Mr. RADFORD thought the amount of work which was required under

the Cambridge Affiliation scheme exceeded what was expected from a university under-graduate in his first year, and he thought a scheme covering a shorter period desirable.

Mr. KEATLEY MOORE pointed out that a little too much had been said about the Cambridge Affiliation scheme, because it was not at all necessary that a precisely similar scheme should be formed for the affiliation of London centres. He felt with Mr. Edwards, that under the present conditions of financial embarrassment the federation of centres should be a feature in any scheme of continuous study. In view of the action taken by the Council and the Joint Board, he would ask leave to propose the following resolution: "That this Conference thankfully recognises the readiness with which the Joint Board has undertaken to prepare a scheme for continuous study, and trusts that centres will earnestly consider the scheme when produced, and do their best towards adopting it."

Mr. J. H. MUIRHEAD, in seconding the resolution, pointed out that in considering the question of continuous study under our present system of organisation, it was important to bear in mind the difference in the character of subjects. There were subjects in which a second or higher course inevitably presupposes a previous one as, perhaps, in Astronomy. It was impossible for local committees meantime to deal with continuous study in this class of subjects, as a higher course presupposing a lower already given meant a greatly diminished attendance. But there was another class of subjects, such as literature and some departments of history, in which second and third courses could be given which do not presuppose attendance at previous courses. With these the Society might well deal. It was impossible indeed for the local committees at present to guarantee successive courses in the same subject, but this difficulty might be met by an *inter-central* arrangement, whereby different aspects of the same subject might be taken up successively at the different centres in London, and in this way students who were willing to go from centre to centre might have a continuous course of study provided.

The MARQUIS OF RIPON: All who are here will agree with me that this Conference has been one of great interest, and that our best thanks are due to Professor Westcott for his splendid address. The real practical utility of this meeting will be that the members of the Universities' Joint Board will have had an opportunity of learning the difficulties of our local representatives. As to whether it would be possible to make the continuous courses in London of the same length as those under the Cambridge Affiliation scheme, it is not for me to say. Certainly there has been a strong expression of opinion that it would be desirable, under the special and peculiar circumstances of London, that the length of the courses should be reduced, but so far only as will not impair their efficiency. We must not lose sight of the great object we have in view, that great object which was put before us with such eloquence by Professor Westcott. Attention has also been called to the break between Easter and Michaelmas, which is a practical difficulty that must be met. I venture to hope that from this evening's discussion, and from the resolution of the Council, supported and accepted by the Joint Board, there may arise a real and valuable extension of the work of this society. We cannot at the present moment look for those rewards which are given by the University of Cambridge, but we may hope that the day will come when something of the kind will be offered to London students. What we have tried to do to-night is to lead up to that. We want to deserve those distinctions when the time comes that they can be offered to us.

I would venture to hope that there will be very great readiness in accepting this resolution of Mr. Keatley Moore's, which will afford the opportunity of a great and lasting benefit to the students if it is practically carried out. I think that our best thanks are due to Professor Westcott for putting before us the objects of our work, and the means by which those objects are to be attained, in such an admirable address, and I beg to move that the best thanks of this meeting be accorded to him.

The Rev. CANON ELWYN seconded the vote of thanks to Professor Westcott.

Professor WESTCOTT: It is quite impossible for me to thank you for the resolution which has been moved in such terms; all that I can say is that I endeavoured to express what I feel most deeply, that the work which you have undertaken, in its breadth and in its influence, is a work worthy of this great city. It is worthy of your loftiest endeavours, and I do trust that those who come after us and carry on the work which has been left will reap the rich results of your labours. I trust that in the new University of London these University Extension Lectures will take their place, because they are recognised as deserving it.

A vote of thanks to Canon Elwyn for his kindness in allowing the rooms to be used for the Conference, and to Lord Ripon for presiding, was proposed by the Rev. Prebendary Whittington, seconded by the Rev. A. Bourne, and carried unanimously. This was acknowledged by Canon Elwyn, who spoke of the gratification it was to him to see such gatherings as that within the walls of the Charterhouse.

# REPORT OF THE COUNCIL

AND

STATISTICS FOR 1887.



THE LONDON SOCIETY  
FOR THE  
EXTENSION OF UNIVERSITY TEACHING.

President : THE RT. HON. G. J. GOSCHEN, M.A., D.C.L., M.P.

*A man needs knowledge not only as a means of livelihood, but as a means of life.—PRESIDENT'S ADDRESS.*

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ABSTRACT  
FROM THE  
RULES AND REGULATIONS OF THE SOCIETY.

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OBJECTS OF THE SOCIETY AND TERMS OF MEMBERSHIP.

1. The object of the Society is to bring University Teaching within reach of persons of all classes and of both sexes living in London and its neighbourhood, and to work in as close connection with the Universities of Oxford and Cambridge and London as may be possible.
2. Every donor of Fifty Guineas is a Life Member, and every Annual Subscriber of Two Guineas is a Member of the Society for one year from the date of payment of his Subscription.
3. Each Member is entitled to attend the Meetings of the Society, and to vote at the election of the Council, and upon all questions submitted to such meetings. He is further entitled to attend any of the Society's lectures free of charge.
4. The Honorary Secretaries of the Society's Local Committees are for the time being Honorary Members of the Society. No subscription or donation is required from such Members, who are nevertheless entitled to the privileges stated in the preceding rule.

COUNCIL AND OFFICERS OF THE SOCIETY.

5. The Government of the Society is vested in a Council of 32 Members, of whom 22 are elected by the Society, and 10 are nominated by the several bodies specified below.
6. Of the elected members of the Council, the one-third who have been longest in office retire every year, but are eligible for re-election.
7. Each of the following ten Educational Institutions of the Metropolis nominates one Member of the Council, viz., Bedford

College, Birbeck Institution, City of London College, College for Men and Women, King's College, London Institution, Queen's College, Royal Institution, University College, and Working Men's College.

8. The officers of the Society are a President, a Treasurer, and a Secretary.

9. The Council has concurred with the Universities of Oxford, Cambridge, and London in the formation of a Universities' Joint Board, to assist and advise the Council generally on Educational matters.

10. The Joint Board consists of three representatives of each of the Universities of Oxford, Cambridge, and London, appointed by the Universities in such manner as they may from time to time determine.

#### MEETINGS OF THE SOCIETY.

11. General Meetings of the Society are summoned by the President; and besides an annual one to be held in February, he may be required to summon a General Meeting by a resolution of the Council, or by a requisition signed by Ten Members of the Society, such resolution or requisition expressing the object for which the Meeting is desired.

12. Seven days' notice at least of every General Meeting, specifying the general nature of the agenda, is given to all Members of the Society by Circular. Ten is the quorum at such Meetings.

13. At the Annual General Meeting in February the Society is called upon to elect a President, a Treasurer, Auditors, and seven Members of Council.

#### SCHEME OF THE SOCIETY'S WORK.

14. The Society's work consists of COURSES OF WEEKLY LECTURES, at different Centres, on various subjects, between ten and twelve Lectures on a subject forming a Course. The Session usually extends over Two Terms of Three Months each, the first commencing in October and the second of January. In certain subjects practical Courses may also be held during the summer, consisting of not less than six fortnightly demonstrations or field excursions, with meetings for discussion and paper work in the intervening weeks.

15. Each Lecture occupies one hour, and is followed or preceded by Class-Instruction and advice as to text-books and means of effectual study. A printed Syllabus is distributed to the Students, and questions are set at each Lecture to be answered in writing at home and submitted to the Lecturer for correction and comment.

16. The Lecturers are nominated by, and their syllabuses submitted to, the Joint Board of the Universities of Oxford, Cambridge, and London.

17. The Lectures are especially intended for young men and women between the period of leaving school and that of settling down in life; but experience has shown that these form only a nucleus around which both older and younger students may be associated. Some of the most successful Lectures have been attended largely by artisans.

#### CERTIFICATES.

18. At the end of each Course an Examination (in writing) is held, which is not compulsory. The Examiner is not the Lecturer, but is specially appointed by the Universities' Joint Board. Only those Students are admitted to the Examination who have attended the Classes as well as the Lectures, and have done such an amount of weekly paper-work as the Lecturer may have required. On the result of the Examination the Universities' Joint Board awards Certificates. Those Candidates who are recommended for distinction by the Lecturer on the result of the weekly work, and by the Examiner on the result of the final examination, will receive a Certificate of Distinction.

19. In addition to the Ordinary Certificates awarded at the end of single Courses of Lectures, the Universities' Joint Board is also prepared to award CERTIFICATES OF CONTINUOUS STUDY, such Certificates being conditional on the previous possession of Six Ordinary Certificates, obtained in Six Different Terms, with these further provisos:—(1) That the Six Certificates shall be in not more than three subjects, and that each subject shall have been studied for at least two consecutive terms; and (2) that the Six Certificates shall comprise not less than two literary (or historical) Certificates, and not less than two scientific Certificates. A Certificate for a Course extending over two terms will, however, count as two Certificates.\*

\* It will thus be seen that a CERTIFICATE OF CONTINUOUS STUDY can be obtained on the results of Three Sessions' Work, provided that (1) the same subject has been studied in both terms of each session; and that (2) the subject has in two years been literary (or historical), and in one year scientific, or *vice versa*. The Council and the Universities' Joint Board regard such courses of continuous study as most important for the continuous development and recognition of the Society's work; and it is hoped that Local Committees will assist the Society by so arranging the Courses of Lectures as to make the acquisition of Certificates of Continuous Study possible at each centre.

## RECOGNITION BY THE SCIENCE DEPARTMENT.

20. The Society's Certificates are now accepted by the Science Department under certain conditions as qualifying the holders, without further examination, to earn payment on the results of their teaching in special subjects which will be considered on their merits. (See Science Directory, § xxxiv.)

## ARRANGEMENTS WITH LOCAL CENTRES.

21. To set the Society's work on foot in any given district it is necessary to form a Local Committee to co-operate with the Council of the Society.

22. Each Local Committee is responsible for its own expenses. The expenses of one Course for a term of twelve weeks are as follows :—(1) A sum of £32 10s. payable to the Society for Lectures, Class-teaching, and Examination ; (2) the expenses of a room, of printing the Syllabus and Examination Paper, and of advertising, etc. The free use of a school-room or other suitable place can often be obtained ; the other local expenses are usually from £5 to £10 a term. If the Course consists of only ten Lectures and Classes the fee is £27 10s. This fee of £32 10s. or £27 10s., as the case may be, is in full discharge of the Society's claims for Lectures and Examinations, the Local Committee in each case meeting the full deficit, if any, or, if there is a surplus, retaining it to be used for the support of future Courses.\*

23. The amount of the fees charged to the Students (as well as the subject of the Course, and the time and place of the Lectures) is settled by the Local Committee at each Centre, and varies with the number of Students expected and the character of the district.

24. The Council of the Society is prepared to make special grants in support of the Lectures in poor districts as far as its resources will permit. Each case will be considered on its merits.

25. The appointment of Lecturers (previously nominated by the Universities' Joint Board) to particular Centres rests with the Council.

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\* An extra charge is made to cover the cost of experiments in the case of subjects like Chemistry, Electricity, &c. Where the lectures are illustrated with the Lantern a charge of £1 is made for the use of slides.

## THE LONDON SOCIETY FOR THE EXTENSION OF UNIVERSITY TEACHING.

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*By the City of London College.*—The Rev. Prebendary WHITTINGTON, M.A., Principal.

*By the College for Men and Women.*—F. STORR, Esq., M.A., Member of the Council.

*By King's College.*—The Rev. H. WACE, D.D., Principal.

*By the London Institution.*—The Rev. W. ROGERS, M.A., Rector of Bishopsgate, Hon. Sec.

*By Queen's College.*—The Rev. Canon ELWYN, M.A., Principal.

*By the Royal Institution.*—Capt. Sir DOUGLAS GALTON, K.C.B., F.R.S.

*By the Working Men's College.*—GEORGE TANSLEY, Esq., Fellow of the College.

*By University College.*—HENRY MORLEY, Esq., LL.D., Professor of English Literature.

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H. S. FOXWELL, Esq., M.A., Fellow of St. John's College; and Professor of Political Economy in University College, London.

The Rev. B. F. WESTCOTT, D.D., Fellow of King's College and Regius Professor of Divinity.

JAMES STUART, Esq., M.A., M.P., Fellow of Trinity College; and Professor of Mechanism and Applied Mechanics.

#### LONDON.

W. GRYLLS ADAMS, Esq., M.A., F.R.S., Professor of Natural Philosophy in King's College.

The Very Rev. G. G. BRADLEY, D.D., Dean of Westminster.

Sir R. N. FOWLER, Bart., M.A., M.P.

#### Hon. Secretary to the Board.

R. D. ROBERTS, M.A., D.Sc. (Lond.), Fellow of Clare College, Cambridge, and of University College, London.

## REPORT OF THE COUNCIL FOR 1887.

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THE Council have again the pleasure to present a satisfactory Report of the work done during the year just ended. Sixty-two Courses of Lectures, and Three Summer Courses of practical work, making a total of sixty-five, were given during the year. The number of entries for these Courses was 5,662, the highest total ever yet reached, while the totals of the average attendance at the lectures, and at the classes, and of weekly papers done for the lecturers, were all in excess of previous years. The largest advance has, however, been made in the number of certificates awarded, the total number for the year 1887 being 612, as against 482 in 1886. The Council desire to draw special attention to this very gratifying proof of the educational progress made during the past year. The Universities' Joint Board have emphasised the importance of weekly work for the lecturers as a condition for entering the examination, and excepting in a few special cases, all the students who obtained certificates had given proof of steady work during the term by doing satisfactory weekly work for the lecturer. The Council are persuaded that it is only by carrying out the University Extension System, which includes class teaching and weekly paper work in addition to the lectures, that a high standard of thoroughness in the work can be attained.

### EXTENSION OF THE WORK.

Lectures were given at nine new centres, while at three only of the old centres was the work entirely abandoned. Some of the centres take a course only in one term of the year, and the Council, while they recognise the greater educational value of continuous work in

both terms, feel it is more advantageous to a district that the work should be carried on from year to year, during one term only, than that two full courses should be attempted when sufficient support is not forthcoming to make them a success. The full details will be found in the Appendix on pages 37 to 43.

#### LOCAL ORGANISATION.

In their last two reports the Council drew special attention to the importance of the formation by local committees of an efficient local organisation, and they recognise with much satisfaction the advance which has been made in this direction during the year. The plan adopted with great success at a number of centres has been to form a local society, membership of which entitles to a ticket for the course (or courses) of lectures. The charge for membership varies in different districts. This plan has proved far more satisfactory than the system of a guarantee fund from term to term, inasmuch as financial failure is impossible if the Committee decide to arrange for no course unless the number of subscribers is sufficient to cover the expenses.

#### SUMMER COURSES.

The recognition of Summer Courses marks a definite step onward in the systematising of the work. The desire had been expressed at centres taking courses on subjects like Botany and Geology, admitting of practical work, that practical Summer Courses should be recognised by the Society. At the request of the Council, the Universities' Board drew up a scheme for Summer work, the details of which have been already announced. Under these regulations, students who have attended Winter Courses in the theoretical part of a subject, may have any success attained by them in a practical Summer Course, of not less than six fortnightly demonstrations or field excursions, with intervening paper work, endorsed upon the certificate obtained for the Winter Course. The Council and the Universities' Joint Board hope by this means to encourage that continuity and thoroughness of work which they feel to be of such vital importance.

#### NEW FINANCIAL ARRANGEMENTS WITH LOCAL CENTRES.

The Council also announced in their report of a year ago that they proposed to take a new departure, so as to place on an entirely

fresh basis the financial arrangements between the Society and the Local Centres. The change has been carried out, and during the term just concluded, twenty-three centres paid the full cost of Lectures, Classes, and Examination (£27 10s. for ten Lectures, &c., and £32 10s. for twelve), and were, as far as the Central Society is concerned, entirely self-supporting.

In the case of the three East-End Centres, Whitechapel (at which four Courses were given), Ponder's End, and Bethnal Green, a special grant was made in aid of each Course. Although fears were expressed that this financial change might prove fatal to the work at some of the Centres, the Council have the greatest satisfaction in stating that they find such fears were entirely groundless, and that no single instance has occurred of the abandonment of the work in consequence of this change. The Council are of opinion that the more independent position in which the centres are now placed by this definite arrangement, has to some extent contributed to the increase of vigour and spirit which has been shown during the past year.

#### THE ANNUAL ADDRESS TO STUDENTS.

On the occasion of the Annual Meeting at the Mansion House in 1886, an address to the students on "Hearing, Reading, and Thinking," was delivered by the President of the Society. On the similar occasion in the past year, an address on the "Study of Literature" was delivered by the Rt. Hon. John Morley. On both these occasions the Egyptian Hall at the Mansion House was crowded with students, and the success of the gatherings was unmistakable. The Council desire to express their sense of the great indebtedness of the Society and the students to Mr. Goschen and Mr. Morley for the stimulus they have given to the work by these addresses. The Council are persuaded that such gatherings as these are a most valuable means of drawing the students more closely together, and giving to the movement that unity which is so essential to its growth.

#### REPRESENTATION OF LOCAL CENTRES ON THE COUNCIL.

Following Mr. Morley's address, a Conference of Members of the Council and Local Representatives was held, and after a valuable discussion, the following resolution was passed:—"That this

Conference urges upon Committees the importance of perfecting their Local Organisation in order to secure the attainment of a higher degree of Educational completeness, and the establishment of the work on a sound financial basis ; and believes that this end would be furthered by the adoption of some plan giving to Centres a more direct representation on the Council." With the view of carrying out the desire expressed at the Conference, the Council invited representatives of the Centres to draw up a list of eight names, out of which the Council might elect members to fill vacancies as opportunities occurred, until four representatives of Local Centres have seats upon the Council. At the first meeting in 1888, Mr. E. C. Sinkler, Hon. Sec. of the Lewisham Centre, was elected by the Council to fill a vacancy, in accordance with the above scheme.

#### CONFERENCES OF LOCAL REPRESENTATIVES.

The Conferences of Local Representatives and Members of the Council which have been held during the year have proved so interesting and valuable that it has been decided to hold two such meetings in each term, for the discussion of questions affecting the well-being of the work. The Council feel confident that these meetings will be a valuable means of furthering that union of the local centres, and of promoting the consolidation of the work towards which some progress has already been made.

#### COURSES FOR ADVANCED STUDENTS.

The need for advanced Courses in some central position which might be attended by students from different centres is beginning to be felt. In connection with every Course of Lectures a certain number of earnest students are anxious to pursue the study of the subject further, but in consequence of the necessity laid upon committees of securing a large audience in order to defray expenses, it is seldom possible to meet the wants of these more advanced students. What is required is a Central Evening College, where such students could find advanced theoretical Courses provided, as well as practical work in the various branches of science. The Institution which naturally suggests itself as especially fitted to become the home of this work is Gresham College. The establishment of advanced Courses of this kind would greatly add to

the efficiency and completeness of the work, and the Council hope that some way will be found of meeting this want.

#### THE PEOPLE'S LECTURES SCHEME.

During the last Summer the Council were urged to allow a number of short Courses of Three Lectures each, to be given under their auspices, with a view to seeing whether large audiences of artisans could be attracted, and with the hope that it would lead to the establishment in some districts of permanent Centres, taking full Courses of Lectures and Classes. As a special fund formed by a contribution from the Gilchrist Trustees, and subscriptions from certain Members of the Council, was placed at their disposal, they felt justified in allowing the experiment to be made. Ten Courses of People's Lectures were given in various parts of London, at different Halls, some very large, like the Bermondsey and Shoreditch Town Halls. These Courses proved remarkably successful, and the large halls named were crowded with appreciative audiences of from fifteen hundred to two thousand people. At these People's Lectures, announcements were made as to the regular work of the Society, and the Council have reason to believe that in some of the districts the way has been prepared for the eventual establishment of permanent Centres for full work.

#### EXAMINERS' REPORTS.

The Council have great pleasure in drawing attention to the special excellence of the work done during the past year, as shown by the Reports of the Examiners. The tone of the reports in general is singularly gratifying.

The examiner of the course on "Milton and Dryden," at Croydon, reports:—"The work of this Centre was again excellent, and the best papers were of remarkable quality." At a new Centre, Bromley, where a course on "Shakespeare's Historical Plays" was given, twenty-eight candidates entered, and the examiner reports:—"This is a very satisfactory Centre. The work is high in average, and very good in the best candidates' papers. There is a very fair amount of quotation from Shakespeare, and the historical parts are well and fully seized. The result ought to be very gratifying to the

lecturer and fruitful for the pupils. On my mark paper the intelligence of the candidates is often noted. Their style of answering is clear, sensible, and always well to the point. I have hardly ever seen better papers in this last respect."

At the Birkbeck Institute the examiner on Political Economy reports:—"The papers gave evidence of considerable thought and fairness of judgment. In most cases the subject was treated with an intelligence and independence of handling unusual in Political Economy, so that some of the answers were thoroughly instructive. The candidates had acquired a valuable interest in the study, and some were on the road to be trustworthy economic thinkers."

At Wimbledon, a Course of Lectures on "Greek Art" was given by Miss Harrison. The examiner says: "The papers that have been submitted to me attain a remarkably high average of excellence. This is true of all the papers. In those which have received the fewest marks, the answers are still good; they are only fewer in number. The candidates seem to have grasped the meaning of the lecturer, whilst almost all of them gave evidence in their answers of having read one or more text-books, and brought themselves in contact with existing remains of Greek Art in the British Museum and elsewhere. I have never experienced more satisfaction in looking over a set of papers than on this occasion. The teaching has been of a very high order, and the candidates have been genuine students." A Students' Society was formed at the end of the Course for the purpose of carrying on the study of Greek Art, during the Spring and Summer.

Of the scientific subjects, Chemistry has proved most attractive, and the reports have been exceedingly satisfactory. During the Michaelmas term, at the various Centres taking this subject, sixty-two entered for examination, all of whom passed, and half obtained the mark of distinction. At Lewisham excellent work was done in Astronomy, and two courses were taken in that subject in consecutive terms. The examiner speaks of the "very high average answering of the candidates," and of the great value the "systematic training thereby indicated" must be to the candidates. The Council desire to point out again that according to the system under which this work is carried on, only those candidates who do satisfactory weekly work for the lecturer are admitted to the final

examination, so that the fact of all passing does not imply, as might be thought, a low standard in the examination. The certificate testifies not merely to the passing of an examination, but also, to the attendance at lectures, and the carrying out of a course of study under the direct superintendence of a lecturer appointed by the Board. The examination takes its proper place as an external test of the efficiency of this work.

#### DONATIONS.

The Council have gratefully to acknowledge the grants which they have received from the Gilchrist Trustees, the Court of Common Council, and the following Livery Companies:—The Clothworkers ; Mercers ; Leathersellers ; Skinners ; Salters ; Merchant Taylors ; Pewterers ; Goldsmiths ; and the Grocers.

The Court of Common Council have renewed their generous grant for another period of five years, while the Clothworkers' Company, from whom the Society has received such substantial support in past years, and whose strong sympathy with educational efforts has been so frequently shown, have not only renewed their grant for a period of years, but have doubled the amount.

The Council feel that the Society owes a special debt of gratitude to the ex-Lord Mayor, Sir Reginald Hanson, and to Sir Owen Roberts, the Clerk of the Clothworkers' Company, for their efforts in support of the appeal made to the City Companies by the President on behalf of the Society, which was so generously responded to. The Council also desire to thank the Cobden Club and Messrs. Cassell and Co. Limited for several prizes offered in connection with certain of the courses. Their special thanks are also due to Miss Harrison for her donation of £30 towards the purchase of photographs to illustrate Art courses. They desire further to record their thanks to Canon Elwyn and the Governors of the Charterhouse for the many favours in the matter of accommodation the Society has received from them.

The Council venture to hope that they may count upon a renewal of these grants from year to year, in order to enable them to still further extend the work in the poorer districts of London, and

establish such facilities as may be necessary for adding to the efficiency of the work.

CHANGES IN THE COUNCIL.

Two seats on the Council became vacant by the resignation of Mr. Hugh Hoare and Mr. Albert Grey. These were filled by the election of Mr. H. L. W. Lawson, M.P., and Mr. E. C. Sinkler, Hon. Sec. of the Lewisham Centre.

DESIRABILITY OF GREATER CONTINUITY IN THE WORK.

In conclusion, the Council, while congratulating the Society and the Students upon the educational progress which the reports of examiners and the statistics show, desire to urge very strongly the importance of developing greater continuity in the work, so as to afford to students that more thorough training, which the following out of a systematic scheme of study, extending over a period of years, would provide.

(On behalf of the Council)

G. J. GOSCHEN, *President.*

R. D. ROBERTS, *Secretary.*

Charterhouse, E.C.

28th February, 1888.

## APPENDIX I.

## PROGRESS OF THE SOCIETY.

	Number of Centres.	Number of Courses.	Number of Entries.	Average number attending Lectures.	Number of Certificates Awarded.
Oct.—Dec. 1876	5	7	139		
<i>First Year, 1877.</i>					
First Term ..Jan. Apr.	7	9	322		
Second Term..Oct. Dec.	5	9	379-601		
<i>Second Year, 1878.</i>					
First Term ..Jan. Apr.	8	11	320		
Second Term..Oct. Dec.	6	8	284-604		57
<i>Third Year, 1879.</i>					
First Term ..Jan. Apr.	4	6	150		
Second Term..Oct. Dec.	13	26	1224-1374		91
<i>Fourth Year, 1880.</i>					
First Term ..Jan. Apr.	13	24	1095		
Second Term..Oct. Dec.	12	20	1142-2237		219
<i>Fifth Year, 1881.</i>					
First Term ..Jan. Apr.	13	17	870		
Second Term..Oct. Dec.	16	26	1691-2489		199
<i>Sixth Year, 1882.</i>					
First Term ..Jan. Apr.	17	35	1459	702	155
Second Term..Oct. Dec.	22	30	1755-3214	850-1552	133-288
<i>Seventh Year, 1883.</i>					
First Term ..Jan. Apr.	19	27	1632	1296	164
Second Term..Oct. Dec.	20	23	1789-3421	1427-2723	129-293
<i>Eighth Year, 1884.</i>					
First Term ..Jan. Apr.	19	22	1691	1371	166
Second Term..Oct. Dec.	23	31	1971-3662	1571-2942	164-330
<i>Ninth Year, 1885.</i>					
First Term ..Jan. Apr.	23	29	1972	1453	198
Second Term..Oct. Dec.	24	34	3223-5195	2419-3872	207-405
<i>Tenth Year, 1886.</i>					
First Term ..Jan. Apr.	22	31	2246	1723	250
Second Term..Oct. Dec.	23	30	2838-5084	2025-3748	232-482
<i>Eleventh Year, 1887.</i>					
First Term ..Jan. Apr.	23	32*	2507	1861	315
Second Term..Oct. Dec.	26	33	3155-5662	2332-4193	297-612

\* Three of these courses were practical courses given during the summer months.

(The Courses, except where otherwise stated, consist of Ten or Twelve Lectures and Classes.)

TABLE I. FIRST TERM : January to March, 1887.

Centre.	Place.	Time.	Subject.	LECTURES.				EXAMINATIONS.			
				No. of Entrants	Fee.	AVERAGE No. at Lecture	AVERAGE No. at Class.	No. of Entrants.	Passed.	Distinguished.	Rejected.
ethnal Green .....	Parish Room .....	P.M. 8-0	Chemistry .....	s. d. 1 0	202	110	85	15	15	..	1
irkbeck Institute .....	Bream's Buildings.....	7-30	" .....	{ 2 6 Mem. 3 6 Non. 2 0}	68	65	58	33	32	29	5
ity of London College	Moorfields .....	8-15	Astronomy .....	95	70	30	9	9	8	1	1
roydon .....	Public Hall.....	4-10	Art.....	25	25	25	8	7	7	1	..
, .....	" .....	7-45	Shakespeare .....	15 0	53	51	49	20	17	16	5
reenwich .....	St. Alphege Mission Room	8-0	Chemistry .....	5 0	87	80	60	34	32	29	3
hammersm'th .....	Lecture Hall .....	8-0	Colonial History .....	5 0	73	57	28	6	7	7	1
ampton Court .....	The Oak Room .....	2-30	Architecture .....	21 0	41	30	25	14	10	10	2
leworth .....	Lecture Hall .....	8-15	English History in Shakespeare	10 6	67	60	25	22	19	15	5
ew and Richmonl ..	Presbyterian Hall .....	8-0	Chemistry .....	5 0	110	100	70	40	31	31	3

+ An examination was held in connection with this course, and two students who had previously obtained Certificates in the Theoretical work had their success in the practical work endorsed thereon.

APPENDIX II. (*Continued*).

(The Courses, except where otherwise stated, consist of Ten or Twelve Lectures and Classes.)

TABLE 2. SECOND TERM : October to December, 1887.

Centre,	Place.	Time.	Subject.	LECTURES.			EXAMINATIONS.		
				Fee.	No. of Entries for Course.	Average No. at Lecture.	Average Class No. at	Average No. at	No. of Entries distinguished.
Basingstoke ! .....	Town Hall .....	P.M. 2-45	Prose Writers of the 19th century	s. d. 20 0	24	18	9	5	2 ..
Bethnal Green .....	Parish Room .....	8-0	Chemistry in Relation to Health	1 0	100	70	50	7	4 ..
Birkbeck Institute .....	Bream's Buildings .....	7-30	Political Economy ...	3 6	50	39	23	18	6 ..
Bromley (Kent) .....	School of Science & Art	3-0	English History in Shakespeare	10 0	126	80	30	25	{ H.E. Malden, M.A., Trin. Hall, Camb.
" " "	" Moorfields .....	8-0	" Climate and Weather	2 6	133	120	40	15	{ A. W. Clayden, M.A., F.C.S., Christ's Coll., Camb.
City of London College .....	Holborn Viaduct .....	8-0	Chemistry of Every-day Life	3 6	100	80	60	12	V. B. Lewes, R.N. Coll.
Finsbury End .....	The Lecture Hall .....	8-15	" Milton and Dryden ..	7 6	166	140	100	40	J. Churton Collins, B.A., Balliol Coll., Oxford
Finsbury End .....	The Public Hall .....	7-45	" " "	15 0	98	69	56	15	S. R. Gardiner, LL.D., Hon. Student of Christchurch, and Fellow of All Souls' Coll., Oxford.
Dulwich .....	Dulwich College .....	8-0	English History 1689-1787	5 0	50	40	19	10	E. J. C. Morton, M.A., St. John's Coll., Camb.
Essex Street .....	Essex Street .....	8-0	Astronomy .....	1 0	102	77	39	7	L. P. Jaeks, M.A., Lond.
" .....	" , .....	8-0	Political Economy .....	1 0	130	100	80	15	10 2 1

\* Six before and six after Christmas.

TABLE 3. Number of Students, etc., during the year 1887.

Number of Entries for Lectures.....	2507 + 3155 = 5662.
Average number at each Lecture .....	1861 + 2332 = 4193, or 74 per cent of the number of Entries for the Lectures.
"    "    "    "    Class .....	1211 + 1342 = 2553, or 45     "    "    "    ",
"    "    "    "    writing weekly papers .....	427 + 441 = 842, or 15     "    "    "    ",
"    "    "    "    Number of Entries for Examination.....	349 + 323 = 672, or 11     "    "    "    ",
Number of Candidates who passed .....	315 + 297 = 612, or 91 per cent of those who entered for Examination.

### APPENDIX III.—Names of the Examiners during the Year 1887.

(The Examiners, who are in no case the same as the Lecturers, are specially appointed by the Joint Board of the Universities of Oxford, Cambridge, and London.)

Subject.	First or Lent Term, Jan. to April.	Second or Michaelmas Term, Oct. to Dec.
Art .....	W. M. Conway, M.A., Professor of Art in Uni- versity College, Liverpool.	.....
Architecture .....	W. M. Conway, M.A., Professor of Art in Uni- versity College, Liverpool.	.....
Astronomy .....	W. L. Mollison, M.A., Fellow and Tutor of Clare College, Cambridge.	Alexander Larmor, M.A., Fellow of Clare College, Cambridge.

Botany .....	S. H. Vines, Sc.D., F.R.S., Fellow of Christ's College, Cambridge.	R. M. Lewis, M.A., Downing College, Cambridge.
Chemistry .....	C. T. Heycock, M.A., King's College, Cambridge.	W. G. Adams, M.A., F.R.S., Professor of Natural Philosophy in King's College.
Colonial History .....	E. J. Payne, M.A., Oxon.	T. F. Tout, M.A.
Electricity .....		
English History .....	T. F. Tout, M.A., Fellow of Pembroke College, Oxford, and Professor of English in St. David's College, Lampeter.	The Very Rev. G. W. Kitchin. Prof. C. H. Herford.
English Literature .....	{ The Very Rev. G. W. Kitchin, D.D. C. H. Herford, M. A., Professor of English in the University College of Wales.	C. A. Fyffe, M.A., Fellow of University College, Oxford.
French Revolution .....		Rev. W. Cunningham, M.A., Trinity College, Cambridge.
Industrial History .....		Charles H. Ralfe, M.A., M.D., F.R.C.P. (Lond.)
Hygiene .....		J. H. H. Teall, M.A., late Fellow of St. John's College, Cambridge.
Meteorology .....		A. Sheridan Lea, Sc.D., Fellow of Caius College, Cambridge.
Physiology .....		Ernest Foxwell, M.A., St. John's College, Cambridge.
Political Economy .....		

